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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/800,495	03/08/2001	Takenori Hirose		2192

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 03/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/800,495

Applicant(s)

HIROSE ET AL.

Examiner

Lynette T. Umez-Eronini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,9,10,18-20,24 and 26-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,9,10,18-20,24 and 26-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Takeishi et al. (US 6,425,801 B1).

As pertaining to claims 1, 2, and 19, Takeishi teaches a method of detecting an endpoint of polishing process. The method comprises the steps of:

simultaneously irradiating lights having different wavelengths from one another onto an optically transparent film formed on a surface of a wafer on which patterns are formed under polishing processing (column 3, lines 35-35; column 4, lines 20-30 and 45-49; column 7, lines 4-14 and column 22, lines 48 - column 23, line 7);

separately detecting interference lights of said respective lights having the different wavelengths caused by interference between lights reflected from a surface of said thin film and surfaces of said patterns formed on said wafer with the lights of the different wavelengths which are irradiated (column 4, lines 32-38 and 49-58);

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detecting the endpoint of polishing processing of said film on the basis of a relationship between intensities of the separately detected interference lights of the different wavelengths (column 4, lines 49-60).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeishi et al. (US 6,425, 801 B1).

Takeishi differs in failing to teach wherein a white light and a UV light provides the light of different wavelengths, respectively **in claims 18 and 20**.

It is the examiner's position that it is known that white light (~400-700 nm) as well as UV light (~200-400 nm) based on its range of wavelength would provide lights of different wavelength.

Hence, it would have been obvious to one having ordinary skill in the art at the time of claimed invention to modify Takeishi by employing white as well as UV light having different wavelengths for the purpose of obtaining the claimed invention.

Claim Rejections - 35 USC § 103

6. Claims 9, 24, 26, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeishi et al. (US 6,425, 801 B1).

Takeishi teaches a method of detecting an endpoint of polishing process. The method comprises the steps of:

simultaneously irradiating lights having different wavelengths from one another onto the said surface of said wafer under polishing processing (column 3, lines 35-35; column 4, lines 20-30 and 45-49; column 7, lines 4-14 and column 22, lines 48 - column 23, line 7);

separately detecting interference lights of said respective lights having the different wavelengths caused by interference between lights reflected from a surface of said thin film and surfaces of said patterns formed on said wafer with the lights of the different wavelengths which are irradiated (column 4, lines 32-38 and 49-58);

detecting reference lights of said reflective lights of said respective lights having the different wavelengths generated by interference between lights reflected from a

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surface of said thin film and surfaces of said pattern formed on said wafer with the lights of the different wavelengths which are irradiated. of said thin film and the endpoint of polishing processing of said film on the basis of a relationship between intensities of the separately detected interference lights of the different wavelengths (column 4, lines 32-38 and 49-58);

detecting the endpoint of polishing processing of said film on the basis of a relationship between intensities of the separately detected interference lights of the different wavelengths (column 8, lines 5-32)..

Takeishi differs in failing to teach the steps of:

forming an optically insulating film on a surface of a wafer on which patterns are formed;

attaching the wafer having the insulating film formed on its surface to a polishing processing machine;

starting polishing processing of the wafer attached to the polishing processing machine;

stopping polishing processing of said wafer on which the endpoint is detected;

detaching the wafer whose polishing processing is stopped from said polishing processing machine; and

forming a new wiring pattern on said insulating film of the wafer detached from said polishing processing machine, **in claim 9.**

Forming a dielectric layer, which is usually silicon oxide and which is optically insulating material and using conventional methods of forming wiring lines on a

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semiconductor wafer by chemical mechanical polishing process; and stopping the polishing process of the wafer on which the endpoint is detected; detaching the wafer from a polishing machine are known (See Takeishi, Background of the Invention, column 1, lines 16-38).

Hence, it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Takeishi by using convention steps of forming, polishing and stopping the polishing of optically insulating layer for the purpose of detecting an optimum endpoint for the desired pattern at which the polishing operation is stopped (Takeishi, column 1, lines 27-29).

Takeishi differs in failing to teach wherein a white light and a UV light provides the light of different wavelengths, respectively **in claims 27 and 28**.

It is the examiner's position that it is known that white light (~400-700 nm) as well as UV light (~200-400 nm) based on its range of wavelength would provide lights of different wavelength.

Hence, it would have been obvious to one having ordinary skill in the art at the time of claimed invention to modify Takeishi by employing white as well as UV light having different wavelengths for the purpose of obtaining the claimed invention.

7. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeishi (US '801 B1) as applied to claim 9 above, and further in view of Hiyama et al. (US 5,838,447).

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It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Takeishi by using Hiyama's polishing detection method for the purpose of reducing polishing time and labor (column 2, lines 14-16).

Response to Arguments

8. Applicant's arguments with respect to claims 1, 2, 9, 18, and 19 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Takeishi differs in failing to teach a polishing rate of the film is evaluated on the basis of the intensities of said detected reflected lights so as to change dressing conditions of a dresser to a pad used for polishing processing on the basis of the evaluation result, **in claim 10** and wherein said dressing conditions include at least one of a dressing pressure **in claim 11**.

Hiyama teaches, "The computing unit **12** calculates the thickness of the oxide layer of the semiconductor wafer **2** from the sum value and compares the sum value with an initial value which has been stored, i.e., an initial value indicative of the intensities of light reflected from the semiconductor wafer **2** before it is polished, and calculates a polishing rate from the absolute value of the difference between the sum value and the initial value which are compared with each other (column 5, lines 6-15).

The aforementioned reads on,

a polishing rate of the film is evaluated on the basis of the intensities of said detected reflected lights so as to change dressing conditions of a dresser to a pad used for polishing processing on the basis of the evaluation result.

Hiyama also teaches, "A constant polishing rate can be obtained by controlling the operating parameters (such as pressure exerted by the top ring or rotational speeds of the turntable and the top ring) of the polishing apparatus on the basis of the obtained data. Further, a service life of the polishing cloth can be judged or estimated, an a dressing parameter for dressing the polishing cloth after the polishing process can be also determined" (column 5, lines 34-42), which reads on,

wherein said dressing conditions include at least one of a dressing pressure.

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Itue

February 23, 2004

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read 'Nadine G. Norton', located below the printed name and title.